MODIS Technical Team

		Code	Bldg	Room	
Ken Anderson	6-6845	421	16W	N81	Technical Officer
John Barker	6-9498	925	22	354	MCST
Bill Barnes	6-8670	970	22	274A	Instrument Scientist 6-1494
John Bauernschub	6-6395	421	16W	N84	System Manager
Carol Blank	6-5021	421	16W	N70	Configuration Support
Cherie Congedo	6-4386	721.1	11	E235	Systems Analyst
George Daelemans	6-3301	724.3	7	231	Thermal Engineer
Mitch Davis	6-4114	738.1	20	43	Electrical Systems
Jack Ellis	6-7954	303	16W	N125	Flight Assurance Manager
Nelson Ferragut	6-8453	723.3	5	338	Structural/Mechanical
Jose Florez	6-2789	738	20	44	C&DH Engineer
Stephanie Gorman	6-9533	421	16W	N70	Document Control
Larissa Graziani	6-6283	724.4	16W	N70	Contamination Engineer
Bruce Guenther	6-5205	925	22	390C	EOS Calibration Scientist MCST Leader
Janine Harrison	6-5324	920	22	G31B	MAST Leader
David Jones	805-562-7433	FAX - CPU 7090, Sec 7527			GSFC MODIS Rep at SBRC
Bob Kiwak	6-5827	300.1			Materials Engineer
Ed Knight	6-2382	925	22	148	MCST
Bob Martineau	6-9479	718.1	11	E41	Focal Plane Engineer
Ed Masuoka	6-7608	920.2	22	166D	SDST Leader
William Mocarsky	6-7156	733	11	E241	
Harry Montgomery	6-7087	925	22	166	MCST
Mike Roberto	6-4004	704.2	16W	N75	Sr. System Engineer
Rick Sabatino	474-1700				Software - Omitron
Harvey Safren	6-5507	733.4	20	1	GSE & IT&T Engineer
Lisa Shears	6-2900	421	16W	N32	Software Manager
Bob Silva	6-0787	421	16W	N70	Flight Assurance Representative
Neil Square	6-0838	284.4	16	243	Contracting Officer
Rick Stickle	6-6426	421	16W	N53	Systems Safety
Les Thompson	6-8382	975	22	288	EOS PM Project Scientist
Rosemary Vail	6-1574	421	16W	N124	Resources Analyst
Gene Waluschka	6-2616	717.4	5	W103	Optics Engineer
Richard Weber	6-5992	421	16W	N83	Instrument Systems Manager
Patricia Weir	6-1453	422	16	124	MODIS PM Instrument Manager

Goddard Area Code & Exchange are 301-286-xxxx

MODIS Team Meeting Minutes

Minutes of the MODIS Team Meeting held on Tuesday August 16, 1994.

Action Items:

91. Clarify the round-robin BRDF measurement requirements. Assigned to Guenther. Due 8/16/94

92. Determine the best way to balance the scan mirror. Assigned to Roberto. 7/19/94. Due 9/ 6/94.

93. Review the Instrument Flight Operations Understanding of 8/26/93. Provide comments by 9/30/94. Assigned to Roberto 8/ 8/94

The following items were distributed:

1) Weekly Status Report #151

2) SBRC Memos submission from week #143

3) Minutes of the previous team meeting

MODIS Technical Weekly August 19, 1994

Florida Vibration test of Mainframe

The mainframe vibration test was successfully completed on August 18. Cherie Congedo and Nelson Ferragut covered the test for the GSFC MODIS technical team. Early comments from Cherie and Nelson were in the August 12 weekly. Tom Wolverton and Jay Neumann from SBRC were also at the test and the following comments are from them:

There was a conversation with Tom Wolverton at Honeywell on August 16. The Y axis was successfully completed on August 15 with full random and sine burst. Before and after each test, there is a low level sine sweep. There was no change in the structure from the Y axis testing. A few comments:

1) The creaking sound was apparently from the bolted interface between the fixture for holding the mainframe and the slip table which mounts to the shaker. New washers which have the proper shape for this interface should be received today.

2) Although there is flexibility in the fixture, the mainframe is getting the proper loading as determined by accelerometers on the mainframe.

3) Some oil was noticed during breaking down the Y axis test configuration. Analysis indicated this was cutting oil. A little oil did get onto part of a kinematic mount. This oil is believed to have been trapped in the fixture during manufacture and then shaken loose during vibration. Bagging of the instrument may be desirable to minimize any contamination from vibration testing. The possibility of cleaning the fixture, slip table, etc. if needed should also be considered.

4) The X axis vibration is expected to show a low significant fundamental mode, perhaps in the mid 20 Hz region due to the flexibility of the mounting fixture.

There was a conversation with Jay Neumann about the vibration testing on August 18:

1) Before X axis test, the special wedge washers were installed between the fixture for holding the mainframe and the slip table.

2) The X axis 1/4 g sine sweep showed a natural frequency of 40 Hz. Jay believes this is due to the combination of the compliance of the kinematic mounts and the fixture. When the mounts were installed, it was noted that the mounts were not very stiff in the region of the spherical bearing.

3) The X axis random was performed on August 16 at 5.7 grms. There were no load vibration noises. However, the Main Electronics Module (MEM) housing vibrated on the -Y side. It had a moderate tone which was loudest at resonance.

4) The X axis sine burst test was run at 16 Hz to stay away from the 40 Hz resonance. It was started at -12 dB and worked up to - 3 dB, -1.5 dB, and - 1 dB. The - 1 dB was enough to get 13 g's into the instrument, so that was the last run. Near KM1, with 11.5 g's on the fixture, there was 13 g's on the other side of the kinematic mount on the mainframe. The displacements could be seen during the test. The post test low level sine sweep showed no shift in resonances.

5) The access panels were removed after the test to check bond lines, etc. There was some debris from the MEM module. Some of the bond lines were checked using a fiber optics high intensity light and a magnifying glass. Where closer study was needed, a 10 x lupe was used. Each of the assemblies was removed from the mainframe. There was some wear associated with the MEM module. There were polish marks on the MEM and the mainframe, primarily on the MEM. This may be because the MEM was not pinned. There is no intention of pinning the MEM, since its alignment is not critical and pinning could contribute to distortions of the mainframe.

System Performance Workshop

The action items from the workshop were listed in the last weekly. Some of these action items involve GSFC personnel, identified here:

7) Action for GSFC: Detailed (high fidelity) analysis of scatter in the scan cavity. The results would determine the need for PF near field scatter measurements vs scan angle - Bruce Guenther

11) SBRC & GSFC to team to investigate possible corrections for the spurious response effects in the filters - Eugene Waluschka

13) GSFC to investigate the potential impact of contamination to near field scatter - Eugene Waluschka

Code 717, the Optics Branch, will consider using the OSAC computer program for surface roughness and scatter analyses.

System Performance Telecon

This telecon was held on Monday, August 15. Participants included Dick Weber, Ken Anderson, Jose Florez, Bill Barnes, and Mike Roberto at GSFC and Lee Tessmer, Oscar Weinstein, Rod Durham, and Tom Pagano at SBRC.

Tom discussed his near term plan to measure near field response, which was documented in a memo to Lee with the same date. The early measurements of near field response with the IAC did not have the sensitivity to measure the effect. SBRC was seeing a extinction ratio of equal or greater than 1000 and needed 100000.

Tom's near term plan involves boosting the electronic gain, increasing the source radiance, and using a larger slit. A ribbon filament lamp may also be used. Longer term involves characterization of the IAC and return to a limited SSMA (ribbon filament, collimator mirror and slit) for the Engineering model.

Detectors

Bob Martineau provided the following:

1) Validation of the test station for the VIS and NIR has gotten to the point of SCA testing.

2) Cold probe low background testing has now been completed for 40 to 50% of the 30 dies for the S/MWIR.

Thermal

George Daelemans mentioned the following:

1) Solid model work by Bob Frederickson shows the scan mirror sees ASTER during part of the scan. Need to determine if there are any radiometric or thermal implications.

2) The report on the radiant cooler performance test has been received.

Scan Mirror Imbalance

Steve Neeck and Scott Lambrose have helped in recommending and providing information on a device to measure the imbalance of the MODIS scan mirror/encoder. It is a Kistler 3-component dynamometer which is being used in the ASTER TIR cryo-cooler disturbance test.

These dynamometers are used by TRW in Los Angeles; and Steve Castles provided a contact, Jeff Raab, at (310) 812-0408.

Steve Neeck has provided a Kistler contact in New York state named Roger Brath at (716) 691-5100 and has requested information. At this time, it appears the cost is $20K to $40K, depending on whether or not analog electronics are included.

Nelson Ferragut mentioned a force limiting approach to do vibration testing which was developed by Terry Charton at JPL. He uses piezo electric washers which pick up forces in all three directions. These could possibility be used for the points where we attach the motor encoder to the mainframe instrument bulkhead. Sensitivity at nominal scan mirror speed is a question.

Electronics

Mitch Davis mentioned that Dick Julian is going to San Francisco this week to meet with Atmel and Actel personnel. The Atmel trip is a routine trip for the purpose of finishing the spec and ordering EE PROMs. Dick is going to Actel to try to understand why the two micron Actel Field Programmable Gate Arrays (FPGAs) are too slow and to get radiation sensitivity information about the 0.1 micron parts.

The EM Main Electronics Module (MEM) without electronics boards or power supplies was baked out over the fourth of July weekend. The MEM did have Terma posts, backplane wiring, etc. Bakeout results have not yet been provided to Mitch.

The Plessey 31750 microprocessor rev I was tested over speed and temperature and worked fine.

Mitch and Jose Florez will be determining the testing which will be done at the electronic board level over temperature in air or thermal vacuum. This would be for performance testing.

Contaminated Mirror Scatter

Gerry Godden points out that for the LWIR one 10 micron particle/cm2 scatters sufficiently to be the limiting source of scatter from a 5 Angstrom RMS surface roughness mirror for angles greater than about 5 degrees from specular. There is also significant scatter at smaller angles. The scatter is linearly proportional to the number of particles. For a class 10000 clean room, he computes the number of 10

micron particles per square cm for a horizontal mirror to be 20, 166, and 2174 after 1, 10, and 100 days respectively. The vertical fall-out rate is about one tenth of the horizontal rate.

Based on work by Spyak and Wolfe, Gerry infers that the SWIR and LWIR aft optics scatter performance is dominated by the allowed maximum size scratches and digs. He believes this may dominate mirror cleanliness and microroughness at all wavelengths.

Gerry has documented his work in a paper called Notes on Contaminated Mirror Scatter, dated August 18, 1994.

Mike Roberto August 19, 1994